SECTION 15300

WATER PUMPS

1. APPLICABLE PUBLICATIONS

1.1 The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only. The latest edition at time of contract award of the referenced publications shall govern:

1.3 American National Standards Institute, Inc. (ANSI) Standards:

B1.l Unified Inch Screw Threads (UN and UNR Thread Form).

B16.l Cast Iron Pipe Flanges and Flanged Fittings, Class 25, l25, 250 and 800.

B16.5 Pipe Flanges and Flanged Fittings.

B40.1 Gages - Pressure Indicating Dial Type - Elastic Element.

1.4 American Society for Testing and Materials (ASTM) Publications:

A 123 Zinc (Hot Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

A 153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware.

A 283 Low and Intermediate Tensile Strength Carbon Steel Plates, Shapes, and Bars.

A 307 Carbon Steel Externally Threaded Standard Fasteners.

1.5 American Water Works Association (AWWA) Standard:

E101 Vertical Turbine Pumps-Line Shaft and Submersible Types.

1.6 Anti-Friction Bearing Manufacturer's Association, Inc. (AFBMA) Standards:

Load Ratings and Fatigue Life for Ball Bearings.

1.7 National Electrical Manufacturers Association (NEMA) Standards:

MG 1 Motors and Generators

1.8 National Fire Protection Association (NFPA) Standards:

No. 20 Standard for the Installation of Centrifugal Pumps.

2. GENERAL REQUIREMENTS

2.1 Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products and shall essentially duplicate items that have been in satisfactory use for at least 2 years. Equipment shall be supported by a service organization that is, in the opinion of the Contracting Officer, reasonably convenient to the site. Pumps of the same type shall be the product of one manufacturer.

2.2 Nameplates: Each major item of equipment shall have the manufacturer's name, address, type or style, model, serial number, and catalog number on a plate secured to the item of equipment. In addition, the nameplate for each pump shall show the capacity in gallons per minute at rated head in feet and speed in revolutions per minute.

2.2.1 Nameplates for each electric motor shall show the horsepower, speed in revolutions per minute, full load current, voltage, frequency, phases, time rating, maximum ambient temperature, insulation class code letter, and service factor.

2.3 Verification of Dimensions: The Contractor shall become familiar with all details of the work, verify all dimensions in the fields and shall advise the Contracting Officer's Representative (COR) of any discrepancy before performing the work.

3. DELIVERY AND STORAGE

3.1 All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

4. PUMP PERFORMANCE

4.1 Pumps shall be capable of discharging quantities of water at maximum pump speed and total pump head with the minimum efficiency indicated. Total pump head in feet shall consist of the pumping level below datum and the static and friction head above datum at design capacity.

5. PUMP AND DRIVER REQUIREMENTS

5.1 Type of Installation: The work shall include furnishing, installing, and testing line shaft vertical turbine pumping units and their appurtenances as indicated. Pumps shall be utilized for a non-potable water supply and installed on a concrete pedestal.

Line shaft lubrication shall be water.
5.2 Pump Drivers: Pumps shall have the type of drive units indicated herein:

5.2.1 Horizontal shaft electric motor drivers shall be provided with ball or roller bearings of adequate strength to carry the hydraulic thrust of the pump impellers and the weight of all rotating parts. The shaft motor shall be sized to transmit the maximum horsepower required by the pump over the entire operating range of the pump.

6. PUMP ACCESSORIES

6.1 Pressure Gage: A pressure gage of the direct-reading type, equipped with a shut-off cock shall be provided on the discharge from each pump. Pressure gage shall conform to ANSI B40.1 and shall be calibrated in pounds per square inch of water in not more than 2 psi. Rating point shall be at approximately the mid-point of the scale.

7. ELECTRICAL EQUIPMENT

7.1 General: Electrical motor-driven equipment specified shall be provided complete with motors, motor starters, and controls. Motor controls, equipment and wiring shall be as specified in SECTION 15116, titled 'ELECTRICAL WORK - INTERIOR'.

7.2 Lineshaft Vertical Turbine Pumps

7.2.1 Electric Motors: Each electric motor-driven pump shall be driven by a weather-protected, Type I or II, totally-enclosed fan cooled continuous-duty electric motor conforming to NEMA MG-1. Motors shall be induction motors having normal-starting-torque and low-starting-current characteristics, and shall be of sufficient size so that the nameplate horsepower rating will not be exceeded throughout the entire published pump characteristic curve. Motor bearings shall provide smooth operations under the conditions encountered for the life of the motor. Adequate thrust bearing shall be provided in the motor to carry the weight of all rotating parts plus the hydraulic thrust and shall be capable of withstanding upthrust imposed during pump starting. Motors shall be rated 230/460 volts, 3 phase, 60 Hz and such rating shall be stamped on the nameplate.

7.2.2 Control Equipment: Automatically controlled pumps shall have three-position MANUAL-OFF-AUTOMATIC selector switch in cover. Additional controls or protective devices shall be as indicated.

8. EQUIPMENT APPURTENANCES

8.1 Attachments: All necessary bolts, nuts, washers, bolt

sleeves, and other types of attachments for the installation of the equipment shall be furnished with the equipment. Bolts shall conform to the requirements of ASTM A 307 and nuts shall be hexagonal of the same quality as the bolts used. Threads shall be clean-cut and shall conform to ANSI Bl.1. Bolts, nuts, and washers specified to be galvanized or not otherwise indicated or specified, shall be zinc coated after being threaded, by the hot-dip process conforming to ASTM A 123 or A 153 as appropriate. Bolts, nuts, and washers specified or indicated to be stainless steel shall be Type 316.

8.2 Equipment Guards: Equipment driven by open shafts, belts, chains, or gears shall be provided with all-metal guards enclosing the drive mechanism. Guards shall be constructed of galvanized sheet steel or galvanized woven wire or expanded metal set in a frame of galvanized steel members. Guards shall be secured in position by steel braces or straps which will permit easy removal for servicing the equipment. The guards shall conform in all respects to all applicable safety codes and regulations.

8.3 Special Tools: A complete set of all special tools which may be necessary for the adjustment, operation, maintenance, and disassembly of all equipment shall be furnished. Special tools are considered to be those tools which because of their limited use are not normally available, but which are necessary for the particular equipment. Tools shall be high-grade, smooth, forged, alloy, tool steel. Special tools shall be delivered at the same time as the equipment to which they pertain. The Contractor shall properly store and safeguard such special tools until completion of the work, at which time they shall be delivered to the Contracting Officer.

8.4 Shop Painting: All motors, pump casings, and similar parts of equipment customarily finished in the shop shall be given coats of paint filler and enamel, or other acceptable treatment customary with the manufacturer and suitable for the intended service. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

9. INSTALLATION

9.1 General: Each pump shall be installed in accordance with the written instruction of the manufacturer.

9.2 Foundations: Anchor bolts and expansion bolts shall be set accurately. Where indicated, specified, or required, anchor bolts shall be provided with square plates at least 4-inch by 4-inch by 3/8- inch or shall have square heads and washers and be set in the concrete forms with suitable pipe sleeves, or both. Any templates necessary and all dimensions for setting the anchor bolts shall be furnished at the proper time. Top of the foundation shall be carefully leveled to permit the pump to hang free.

10. TESTING

10.1 Factory Pump Test: Factory pump performance test shall be made in conformance with AWWA E101 for the following:

a. Running test.

b. Witnessed running test.

c. Sample calculation from test readings.

d. Shop inspection.

e. Hydrostatic test of bowl assembly.

f. Hydrostatic test of discharge head.

10.2 Field Equipment Test: After installation of the pumping units and appurtenances is complete, operating tests shall be carried out to assure that the pumping installation operates properly.

10.2.1 Tests shall assure that the units and appurtenances have been installed correctly, that there is no objectionable heating, vibration, or noise from any parts, and that all manual and automatic controls function properly.

10.2.2 If any deficiencies are revealed during any tests, such deficiencies shall be corrected and the tests shall be re-conducted.

11. PAINTING AND FINISHING

11.1 Unless otherwise specified all exposed ferrous metal not factory finished shall be painted as specified in SECTION 09900, titled PAINTING. No factory finished equipment or arpurtenances shall be painted except that damaged factory finishes shall be retouched in an acceptable manner with paint obtained from the manufacturer. Nameplates shall not be covered with paint but shall be cleaned and legible at completion of the work.

***** END OF SECTION *****